REMARKS

Entry of the foregoing, re-examination and reconsideration of the subject matter identified in caption, as amended, pursuant to and consistent with 37 C.F.R. §1.112, and in light of the remarks which follow are respectfully requested.

Claims 1, 3-14 and 16-22 are pending in the application, claims 2 and 15 having been canceled and claims 21 and 22 having been newly presented. Applicant notes with appreciation the allowance of claims 1-10.

By the foregoing amendments, claims 2 and 15 have been canceled, and the features thereof have been incorporated into claims 1 and 11, respectively, to further define the photodefinable composition and waveguide core structure, respectively. Claims 7 and 11 have further been revised by including the "substituted or unsubstituted" terminology set forth in claim 2. Claim 20 has been revised by deleting "or embossed" for consistency with the earlier recited "forming by printing". New claims 21 and 22 point out further aspects of the invention.

Applicants thank the Examiner for her time and consideration during the telephonic Interview of September 27, 2005. During the Interview, the rejections of record, the applied documents, as well as the foregoing amendments, were discussed. In this regard, the issues discussed during the interview are included below in the remarks to the rejections.

Turning now to the Official Action, claims 11, 13, 15, 16, 18 and 19 stand rejected under 35 U.S.C. §102(b) as being anticipated by Sun et al ("Silica-Based Circular Cross-Sectioned Channel Waveguides"). In addition, claims 14 and 17 stand rejected under 35 U.S.C. §103(a) as being obvious over Sun et al. These rejections are respectfully traversed for the following reasons.

The present invention relates generally to the field of optical waveguides. In particular, the present invention relates to optical waveguides that are rounded in cross-section and to methods of forming such optical waveguides. In addition, the invention relates to electronic devices that include such optical waveguides and to methods of forming such electronic devices.

Claim 11, as amended above, sets forth a method of forming an optical waveguide. The method involves: (a) providing a substrate having on a surface thereof a

cladding layer of a material having an index of refraction; (b) forming over a portion of the cladding layer a waveguide core structure comprising at least one material chosen from substituted or unsubstituted polyamides, polyimides, poly(meth)acrylates, polyurethanes, polycarbonates, epoxies, polysiloxanes, polysilsesquioxanes, norbornenes, silicates and SOL-Gels, and silicon oxides, silicon nitrides, silicon oxynitrides, and doped glasses; and (c) heating the waveguide core structure to a temperature and for a time effective to reflow the structure such that it becomes at least partially rounded in cross-section, wherein the reflowed structure has an index of refraction greater than the index of refraction of the cladding layer.

Sun et al describes a method to fabricate silica channel waveguides with a circular cross-section. First, regular rectangular cross-sectioned channel waveguides are fabricated with flame hydrolysis deposition (FHD) followed by reactive ion etching (RIE), as shown in Figures 1(a) and (b). GeO_2 is doped in the waveguide core to raise its refractive index. A selective wet etching step together with heat treatment is then applied to round the cross sections of the waveguides.

Sun et al does not disclose or suggest each feature of the presently claimed invention. For example, Sun et al does not disclose or fairly suggest forming over a portion of the cladding layer a waveguide core structure. As illustrated, for example, in Figure 2(d) of the present application, waveguide core structures 10 are formed over a portion of cladding layer 4 - that is, exposed portions of the cladding layer 4 exist in addition to the regions covered by the formed core structures 10. In this exemplary aspect of the invention, the core structures may be formed by use of a photoimageable material, whereby the cores are patterned using a photolithographic technique while the underlying cladding layer remains. In stark contrast, Sun et al discloses formation of rectangular cross-sectioned channel waveguides wherein both core and cladding layers are etched by reactive ion etching. The core structure in the Sun et al method is not formed over a portion of the cladding layer, but is coextensive with or overhangs the cladding as illustrated in Figures 1(b) and 1(c), respectively. It should thus be clear that Sun et al does not disclose or suggest forming a waveguide core structure over a portion of the cladding layer. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 20 stands rejected under 35 U.S.C. §102(b) as being anticipated by Keyworth et al (U.S. Patent No. 5,534,101). This rejection is respectfully traversed for the following reasons.

Claim 20 involves a method of forming an optical waveguide, comprising: (a) providing a substrate having on a surface thereof a cladding layer of a material having a first index of refraction; and (b) forming by printing over a portion of the cladding layer a waveguide core structure having a second index of refraction that is greater than the first index of refraction, wherein the waveguide core structure as printed is at least partially rounded in cross-section.

Keyworth et al relates to methods and apparatus for making integrated optical light guides on substrates. The Keyworth et al method involves forming an optical light guide on the surface of a substrate by ejecting a first curable light guide forming liquid from a nozzle onto a substrate and curing the material to form an optical element. A waveguide may be formed by moving the nozzle in a linear pattern over the surface of the substrate while ejecting the first curable light guide forming material from the nozzle. A multilayered waveguide may be formed by ejecting a second light guide forming liquid onto the first and curing it. A core and cladding may be formed simultaneously by ejecting core forming liquid from an inner tube and cladding forming liquid from an annulus about the inner tube. (Col. 2, lines 12-32).

Keyworth et al does not disclose or suggest each feature of the presently claimed invention. For example, Keyworth et al does not disclose or fairly suggest formation of a waveguide core structure which is at least partially rounded in cross-section, as set forth in claim 20. As described in the present application with reference to Figure 1, the phrase "at least partially rounded in cross-section" means:

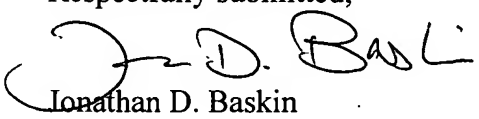
> that the angle α formed at the point of contact between the waveguide core structure 10 and the underlying substrate 1 is less than 90°, for example, less than 80°, less than 70°, less than 60°, less than 45°, less than 30°, less than 20°, less than 10°, and 0° in the case of a perfectly circular cross-section. (Specification at page 5, lines 22-26).

Keyworth et al does not disclose or suggest a waveguide core structure having a contact angle which is less than 90°. Accordingly, withdrawal of the §102(b) rejection based on Keyworth et al is in order.

From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order, and such action is earnestly solicited.

If there are any questions concerning this paper or the application in general, the Examiner is invited to telephone the undersigned at her earliest convenience.

Respectfully submitted,



Jonathan D. Baskin

Attorney for Applicant
Registration No. 39,499
Telephone No.: (508) 787-4766
Facsimile No.: (508) 787-4730

c/o EDWARDS & ANGELL, LLP
P.O. Box 55874
Boston, Massachusetts 02205
Date: September 28, 2005